

# Implication of core-shell particle model for remote sensing of atmospheric aerosol

**Yevgeny Derimian<sup>a,\*</sup>, Florin Unga<sup>b</sup>, Oleg Dubovik<sup>a</sup>, Tatyana Lapyonok<sup>a</sup>, Marie Choël<sup>c</sup>, and Karine Deboudt<sup>d</sup>**

<sup>a</sup>*Univ. Lille, CNRS, UMR 8518 – Laboratoire d’Optique Atmosphérique, F-59000 Lille, France*

<sup>b</sup>*The Cyprus Institute, Energy, Environment and Water Research Centre, Nicosia, Cyprus*

<sup>c</sup>*Univ. Lille, CNRS, UMR 8516 – Laboratoire de Spectrochimie Infra- rouge et Raman, F-59000 Lille, France*

<sup>d</sup>*Univ. Littoral Côte d’Opale, CNRS, EA 4493 – Laboratoire de Physico-Chimie de l’Atmosphère, Dunkerque, France*

*\*Presenting author (yevgeny.derimian@univ-lille.fr)*

Our work shows that directional and polarimetric characteristics of scattered light is sensitive to aerosol particles inhomogeneity. We thus suggest that the aerosol inhomogeneity can be detectable by advanced remote sensing measurements. In a series of numerical simulations, which are also linked to microscopic images of in situ particles, we analyze manifestations of core-shell structure in retrievals of aerosol optical and microphysical properties. Based on the conducted simulations we suggest that a sensitivity to the core-shell structure exists in those observational configurations where information about the phase function in an extended angular range and polarimetric measurements are used, and that scattering in the backward directions is particularly important. We therefore propose a parameterization of aerosol core-shell structure that can be employed for aerosol modeling in satellite or ground-based remote sensing. Given that the aerosol shell is usually a soluble material, the approach can provide such valuable information as the aerosol water fraction. Retrievals from satellites (e.g., POLDER/PARASOL) and ground-based photometric (AERONET) observations are finally discussed.

Preferred mode of presentation: Poster